damaged.... If further procrastination and bureaucratic delays prevent effective and timely action, the world will have stood by and watched as the magnificent eastern lowland gorilla becomes the first great ape to be driven to extinction—a victim of war, human greed and high technology."

Making the Connection

Somehow, it's not surprising that this information isn't included in the instruction manual that comes with your cell phone. Perhaps mobile phones should be outfitted with stickers that read: "Warning! This device was created with raw materials from central Africa. These materials are rare, non-renewable, were sold to fund a bloody civil war and have caused the virtual elimination of endangered species. Have a nice day." People need to realize that there is a direct link between the gadgets that make their lives more "convenient" and the frightening reality of the violence, turmoil and destruction that plague our world.

CELL-PHONE DEVASTATION

BY SPROCKET

The production and disposal of cell phones exacts a severe environmental cost. As wireless technology becomes more widespread, the Earth pays the price.

A cell phone is basically a handheld computer with an antenna, microphone, speaker and battery. These various components are soldered onto a main circuit board, which contains several tiny computer chips, including the digital signal processor, the microprocessor, the ROM and flash memory chips, and the radio frequency amplifiers.

These components require complex, environmentally costly manufacturing. According to the Silicon Valley Toxics Coalition, the production of just a single silicon computer chip requires:

- 3,200 cubic feet of bulk gases
- 22 cubic feet of toxic, corrosive and volatile gases
- 2,275 gallons of de-ionized water (a suspected liver, gastrointestinal and neurological toxin)
- 20 pounds of assorted chemicals
- 285 kilowatt hours of electricity (enough to power a modest US home for one month)

It also produces 25 pounds of highly corrosive sodium hydroxide, 2,840 gallons of wastewater and seven pounds of miscellaneous hazardous wastes. In addition, computer chip production leaves behind a laundry list of air- and waste-stream pollutants, such as arsenic, lead, chromium, acid fumes and volatile organic compounds. It's no secret that the pollutants in wastewater eventually end up in wells, reservoirs, watersheds and marine ecosystems, where they are detrimental to human and nonhuman life alike. Many of these toxic compounds are found on the EPA's list of "persistent, bio-accumulative and toxic chemicals," and they can cause a range of adverse human health effects, including reproductive and developmental problems, cancer and damage to the nervous system.

To add to the problem of high-tech industrial manufacturing, there is the issue of used cell phone disposal. An Environmental Protection Agency (EPA)-funded report from February 2004 concluded that cellular phones alone are expected to make up 65,000 *tons* of landfill waste in 2005.

Why so much waste? Calling plans are often packaged with a free or low-cost cell phone, which makes keeping your current phone economically disadvantageous. Therefore, many cell phones are thrown out even before becoming technologically obsolete. According to a 2002 article in *BusinessWeek Online*, this trend, coupled with an ever-increasing number of features—such as email and Internet access, 3D games, video cameras, and music and movie downloads—leads consumers to get new phones approximately every 18 months.

Not only does this use landfill space, it also means that the lead, arsenic, bromated flame-retardants and other hazardous substances contained in mobile phones have another chance to enter the environment. As the cell phones sit in landfills, rainwater leaches these chemicals and heavy metals into the water table and soil.

Other silent killers are the cellular towers, transmitting the signals that make wireless communication possible. According to an August 2002 press release by the American Bird Conservancy and Forest Conservation Council, the number of birds killed annually by accidental collisions with such towers may be as high as 40 million. More than 40,000 communications towers standing taller than 200 feet are found in the US, and this number will likely double in the next 10 years.

We are killing ourselves and poisoning life on the planet—all for the sake of convenience. We are giving our children a world of poison so that we can know where they are at all times. We are contaminating the soil that grows our food so that we won't have to make another trip to the grocery store. Let's put an end to this madness. Let's bury this high-tech industry instead of its hazardous waste.

artwork by Steve Barrod

Your Mobile Phone is

"Strange that science, which in the old days seemed harmless, should have evolved into a nightmare that causes everyone to tremble."

—ALBERT EINSTEIN

BY SPROCKET

The past few decades have been a time of unprecedented technological development, increasingly altering the way we live, work and communicate. The widespread use of the mobile phone is perhaps the most visible symbol of this technological revolution.

An estimated 57 percent of Americans use cellular phones. By the end of the year, worldwide cell phone usage is expected to reach two billion subscribers (roughly one third of the planet's population), making cell phone subscribers more common than landline users. At the same time, this technology has given rise to important questions about its possible long-term health consequences. Unfortunately, most people are either unaware of the consequences or are unsure how to navigate the conflicting evidence on the issue. Others are simply tired of hearing about things that give them cancer.

Wireless Technology Research and George Carlo

Admittedly, the body of evidence contributing to the debate is enormous and daunting—more than 6,000 scientific studies have been conducted on the subject since 1993. Mobile phones first became available to the public in the mid-1980s.

In response to a widely publicized court case involving a Florida woman who died in 1992 from a brain tumor allegedly caused by cell phone use, the Cellular Telephone Industry Association (CTIA) set up the Wireless Technology Research (WTR) program in 1993. This program was an attempt by the wireless industry to recoup its losses and quell public fear after the lawsuit caused a sharp decline in company stocks. WTR, which employed a board of handpicked scientists and industry representatives, was funded to the tune of $27 million to "identify and solve any problems concerning consumers' health that could arise from the use of these phones."

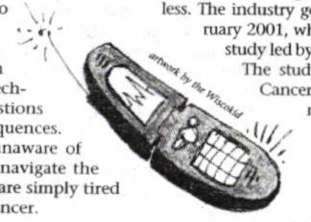
In February 1999, WTR director Dr. George Carlo—who had previously maintained that mobile phones were safe—stunned the industry during a presentation to the annual CTIA convention. Specifically, Carlo reported that:

- The rate of death from brain cancer was higher among handheld cell phone users than among those who used a hands-free option, such as a headset or earpiece.
- The risk of acoustic neuroma, a benign tumor of the auditory nerve, was 50 percent higher in people who reported using cell phones for six years or more.
- The risk of neuro-epithelial tumors on the outside of the brain was more than doubled in cell phone users when compared to non-users.

Carlo stated that "appropriate steps have not been taken to protect consumers." In his subsequent book, *Cell Phones: Invisible Hazards in the Wireless Age*, Carlo continued to expose such health risks, as well as the tricks that the global wireless industry uses to confuse the science and distort the evidence.

The Danish Mobile Phone Study

The WTR's findings were a startling blow to cell phone manufacturers, but phone sales continued to grow nonetheless. The industry got a big public relations boost in February 2001, when international media reported on a study led by Danish scientist Christoffer Johansen. The study, entitled "Cellular Telephones and Cancer—a Nationwide Cohort Study in Denmark," declared that mobile phone users were no more likely than anyone else to suffer brain or nervous system cancers. Within days, the industry-funded study was being promoted around the world as final proof that mobile phones were safe to use.



artwork by the Wiscokid

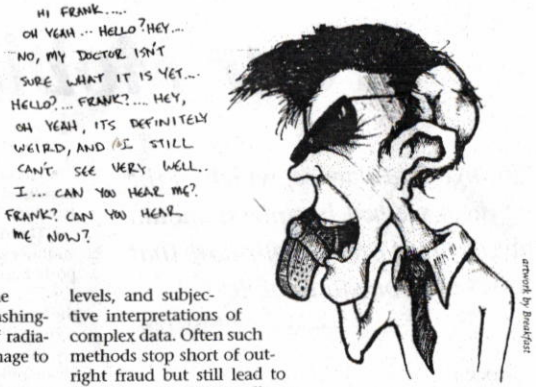
While the Denmark study included more than 420,000 subjects, only a few thousand had used mobile phones for more than 10 years, while the majority of those studied had only used them for approximately three years. In fact, Johansen cautioned that the study might "have too few heavy users to exclude with confidence a carcinogenic effect on brain tissue following intensive, prolonged use." Leading scientists recognize that many brain tumors have a latency period of at least 10 years. Of course, very few, if any, of these details were publicized by the international media, which was eager to give mobile phones a clean bill of health.

Animal Test Results

Yet the evidence against cell phones neither began nor ended with the WTR study. Though inhumane and sickening, animal tests have strongly indicated that exposure to the microwave radiation emitted by cell phones is damaging to living beings.

One such study, led by Leif G. Salford (department of neurosurgery, Lund University, Sweden) in 2003, found serious neuronal damage in the brains of rats following exposure to microwave radiation from a cell phone—at radiation levels comparable to what people would experience during normal

Killing You


HI FRANK.....
OH YEAH... HELLO? HEY...
NO, MY DOCTOR ISN'T
SURE WHAT IT IS YET...
HELLO?... FRANK?... HEY,
OH YEAH, ITS DEFINITELY
WEIRD, AND I STILL
CAN'T SEE VERY WELL..
I... CAN YOU HEAR ME?
FRANK? CAN YOU HEAR
ME NOW?

artwork by Breakfast

use. Damage to nerve cells was observed in several places within the brain, including the cortex, hippocampus and basal ganglia (the areas of the brain that control memory, movement and sensation). The authors of the study expressed concern that "after some decades of often daily use, a whole generation of cell phone users may suffer negative effects, perhaps as early as middle age."

More supporting results come from Henry Lai in the department of bioengineering at the University of Washington-Seattle. Lai has documented biological effects of radiation absorption on laboratory rodents, including damage to DNA and decreases in cell division after exposure.

These are just two of many studies suggesting that exposure to the radiation emitted by cell phones is not as safe as the telecommunications industry would have us believe.

Market-Driven Society

All of this information raises the question: Why aren't cell-phone users cautioned? Why aren't cell phones simply taken off the shelves and the companies that manufacture them shut down? Robert Kane, a former Motorola engineer and author of *Cellular Telephone Russian Roulette,* explains, "More testing has been done that indicates biological damage [from cell phones] than with other products that have been removed from the marketplace. But this is an economy-driven society, and the device is not going to be taken out of the hands of the public."

Invariably, most battles over major public health issues in the last few decades (e.g., asbestos, pesticides, dioxin, PCBs and cigarettes) have involved public health activists insisting that government regulators take a "precautionary approach," while the industries concerned lobby for the strict application of "scientific proof" before restrictive measures are imposed. The corporations know that "scientific" proof is virtually unobtainable until the damage has been done, and that lifelong cumulative harm will take another generation to document. They know that the "strict application of sound science" will keep them off the hook for years to come. The fight to expose the health risks of cell phones is following this same pattern.

Further frustrating any attempts to slow or stop the telecommunications industry are the opinion-manipulating skills developed by corporate lobbyists, polling companies and public relations consultants. These groups are aided and abetted by scientists who are sometimes overtly corrupt, but are more often simply co-opted by the system of research funding and control.

As Cornell University's Joseph Hotchkiss puts it, "A host of techniques exist for manipulating research... to produce studies whose conclusions fit their sponsor's predetermined interests. These techniques include adjusting the time of a study (so that toxic effects do not have time to emerge), subtle manipulations of target and control groups or dosage levels, and subjective interpretations of complex data. Often such methods stop short of outright fraud but still lead to predictable results. Usually associations that sponsor research have a fairly good idea what the outcome will be, or they wouldn't fund it."

More than Just Cancer

With technology advancing much more rapidly than our ability to study its possible health hazards, it is entirely reasonable to be concerned about the more subtle ways that we are affected. An increasing number of people believe that continued exposure to electromagnetic fields has a deleterious effect on the fragile systems of the human body. According to Roger Coghill, director of the UK-based Coghill Research Labs, "We use mobile phones by holding them against our brain, the most sensitive organ in our bodies. Our heartbeats are mediated by electric fields; our energy... is synthesized using electric fields and our body's endogenous electric fields are uniquely protective of the immune system. All of these processes are perturbed by mobile-phone- and related radiations. Damage to DNA, permeability of the blood/brain barrier, immune system dysfunction and adverse effects on key enzymes are becoming commonplace findings by researchers in this field."

The evidence speaks for itself. We have been handed yet another technological marvel for everyday use by yet another greedy industry. That industry will do anything and everything to maintain its profit margin—even if it means lying outright about how our bodies and minds are affected. Have we learned nothing from the tobacco lawsuits, from pesticides and nuclear radiation? Every time a new technology is developed, we are assured by specialists and experts that we have nothing to worry about. And every time, we eventually discover that we were lied to.

When are we going to stop devouring every new, high-tech toy that they throw at us, and start asking: Do I really need this? Is it really worth the risk?

When will we decide that we have put enough of their poison into our bodies? Cell phones are where I draw the line.

Sprocket lives in Tucson, Arizona, where in a last-ditch effort to quell the tide of encroaching technology, he waits until he gets home to make phone calls.

High-Tech Genocide

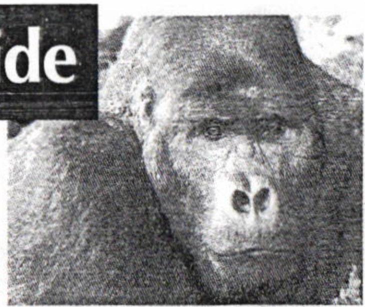


photo courtesy Dian Fossey Gorilla Fund

The war in central Africa is driving the eastern lowland gorilla to extinction.

BY SPROCKET

Cell phones may have revolutionized the way we communicate, but in central Africa, their biggest legacy is war and the extermination of endangered species.

More than four million people have died in central Africa in a war over coltan, a heat-resistant mineral ore widely used in cell phones, laptops and other high-tech electronics. Coltan is found in three-billion-year-old soils like those in the Rift Valley region of Africa. The tantalum extracted from the ore is used to make tantalum capacitors, tiny components that are essential in managing the flow of current in electronic devices. Eighty percent of the world's coltan reserves are found in the Democratic Republic of Congo (DRC).

This mountainous jungle area is the battleground of what has been grimly dubbed "Africa's First World War," pitting Congolese forces against those of six neighboring countries and numerous armed factions. The victims are mostly civilians; starvation and disease have killed hundreds of thousands, and the fighting has displaced two million people from their homes. Often dismissed as "just an ethnic war," the conflict is actually a battle over the natural resources that are sought by foreign corporations—diamonds, tin, copper, gold and—most of all—coltan. At stake for the heavily armed militias and governments is a cut of the high-tech boom of the 1990s, in which the price of coltan skyrocketed to nearly $300 per pound.

Rebel armies in the Democratic Republic of Congo are fighting over coltan, a mineral essential to cell-phone circuits.

The war started in 1998 when Congolese rebel forces, backed by Rwanda and Uganda, seized the eastern DRC and moved into strategic mining areas, attacking villages along the way. The Rwandan army was soon making an estimated $20 million a month from coltan mining.

Today, the fighting rages on despite peace treaties signed in Summer 2002. The peace process was initiated after the assassination of DRC President Laurent Kabila in January 2001, and following mounting pressure from South Africa. But while foreign troops have officially withdrawn from the DRC, internal factions remain at war.

Digging for "Black Gold"

Coltan has also transformed the DRC in more subtle ways. Farmers displaced from their lands have little option but to join coltan-mining brigades. Mined much like gold, coltan is found by digging large pits in riverbeds, with miners scraping away at the dirt to get to the coltan below.

Reports of rampant human-rights abuses pour out of the rebel-controlled mining region, where there is also a huge market for prostitution. An estimated two million people in the DRC are HIV-infected. Local men, women and children are forced into mining, fighting and sex work, or they are threatened with torture, rape and murder.

The coltan makes its way out of the mines to "trading posts," which are taxed or controlled by the rebels. Foreign traders then buy the mineral and ship it abroad, mostly through Rwanda.

All of it ends up being bought by just three companies—Cabot, Inc. of the US, Germany's HC Starc and China's Ningxia—which are the only firms with the capability to turn coltan into the coveted tantalum powder. The "magic powder" is then sold to Nokia, Motorola, Compaq, Sony and other manufacturers for use in cell phones and other products.

On a side note, Sam Bodman, former CEO of Cabot, was appointed in December to serve as President Bush's Secretary of Energy. Under Bodman's leadership from 1987 until 2000, Cabot was one of the largest polluters in the US, accounting for 60,000 tons of airborne toxic emissions annually.

Ecological Effects of the War

The main coltan mining area within the DRC contains the Kahuzi Biega National Park (KBNP), home of the critically endangered eastern lowland gorilla. Deforestation from mining has destroyed much of the gorilla's habitat, and the poverty caused by the displacement of the local human populations has led to gorillas being killed and sold as "bush meat" to the miners and rebel armies that control the area.

The KBNP population of eastern lowland gorillas, along with the population in the adjacent Kasese forests, represented 86 percent of the subspecies' total population prior to the civil war. According to a report released by the Dian Fossey Gorilla Fund and the Born Free Foundation in May 2001, the population of eastern lowland gorillas in KBNP has plummeted from an estimated 8,000 in 1991 to less than 1,000 individuals in the year 2000, an 85 percent crash in only nine years. The report continues: "The indications are that the biodiversity of the Kahuzi Biega region has been seriously, if not irreparably,